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(56) Documents Cited

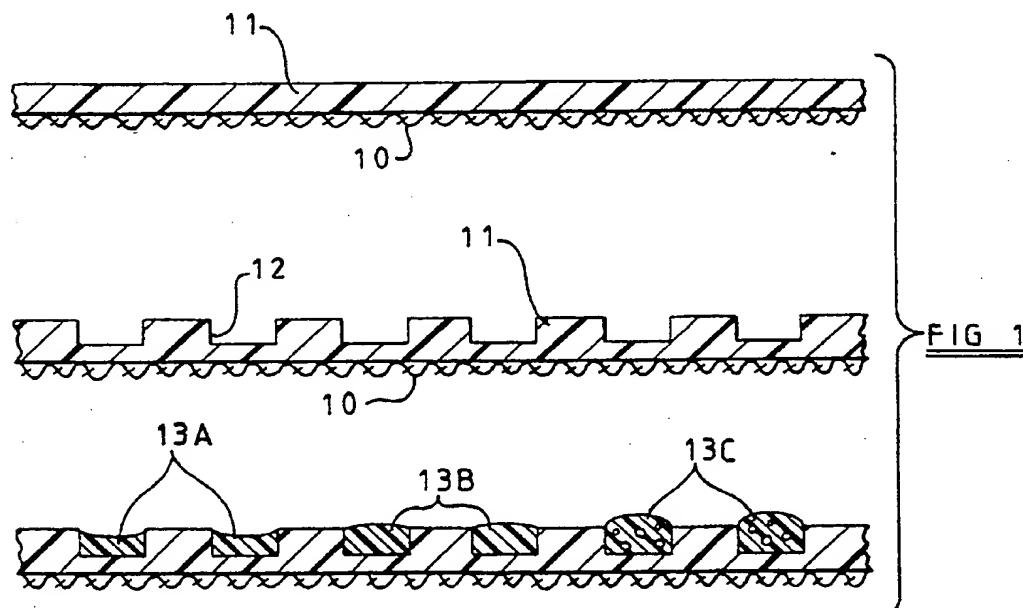
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(58) Field of Search

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INT CL<sup>6</sup> A43B 13/38 13/40 17/14, B32B 3/26 3/30 5/24  
ONLINE:WPI, CLAIMS

## (54) Producing material for an insole

(57) Material for a insole is produced by applying a foam layer (11) to one surface of a layer of backing material (10), allowing the foam layer to partly cure and then embossing the layer to produce a pattern of depressions (12). The layer (11) is then fully cured and the depressions may be filled with hard foam material which is then cured and this forms nodules (13A, 13C) depending on the speed of cure which in the use of the insole provide a massaging effect.



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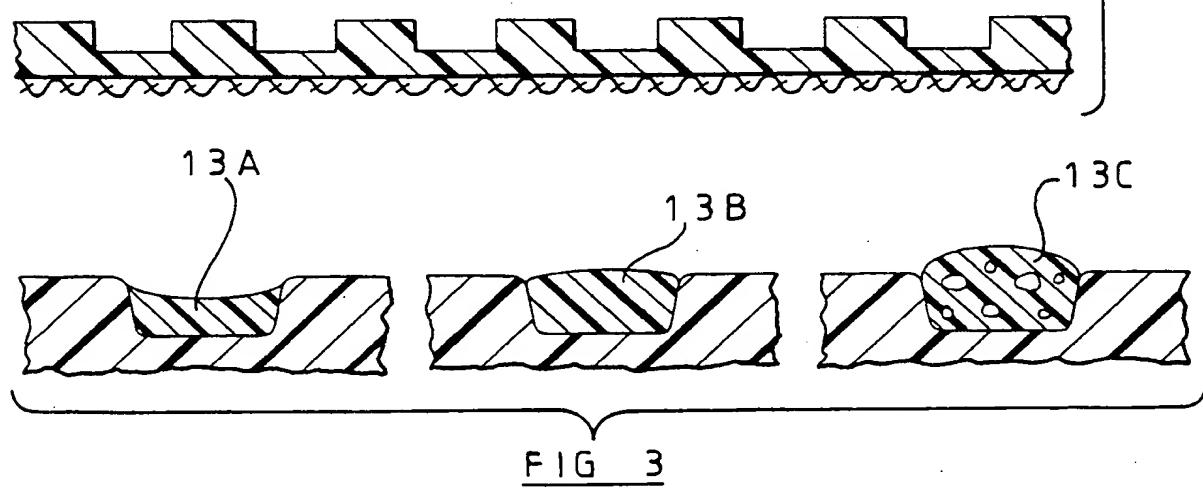
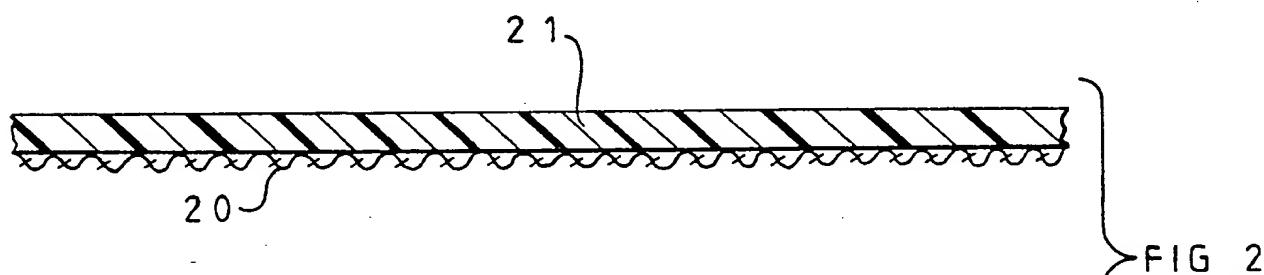
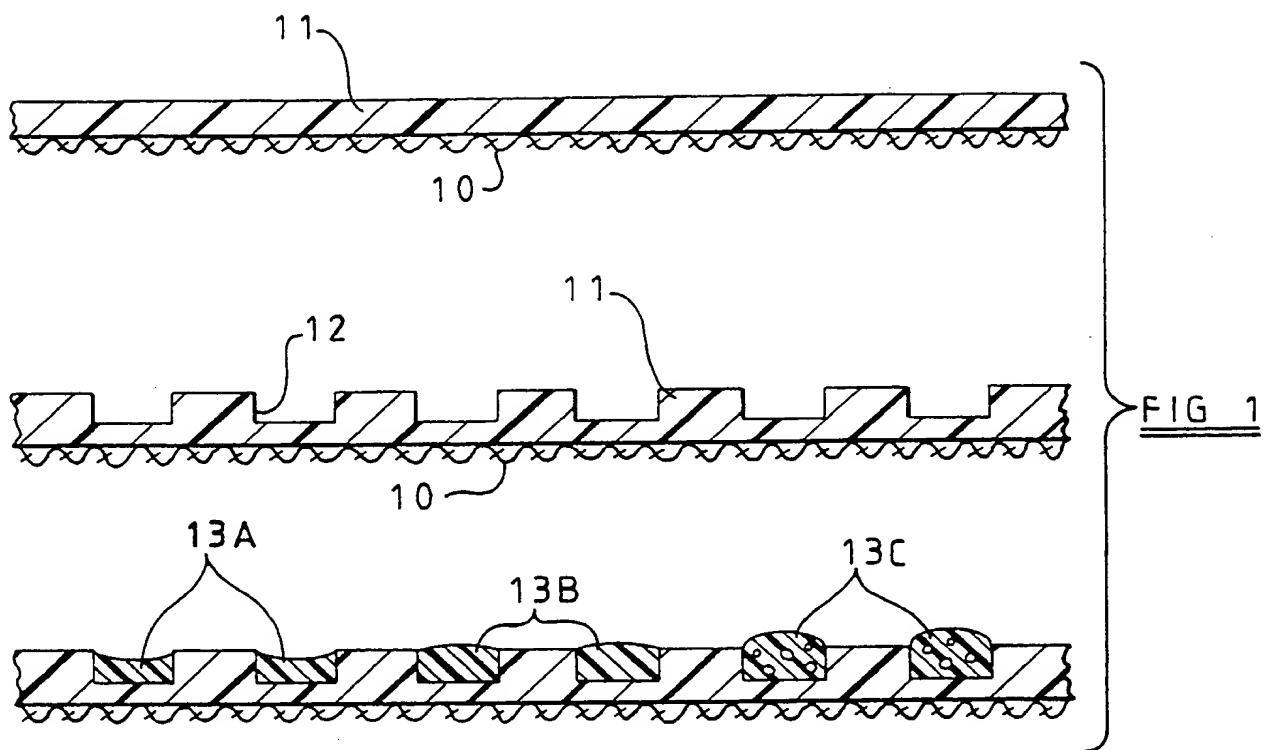


FIG 4

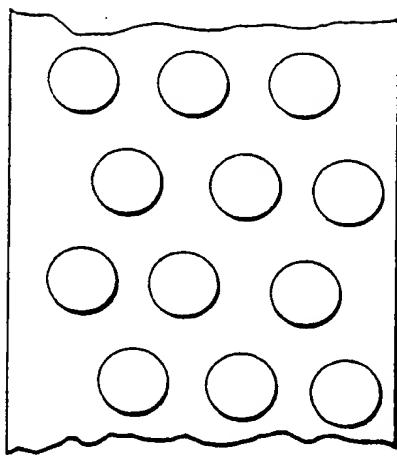


FIG 5

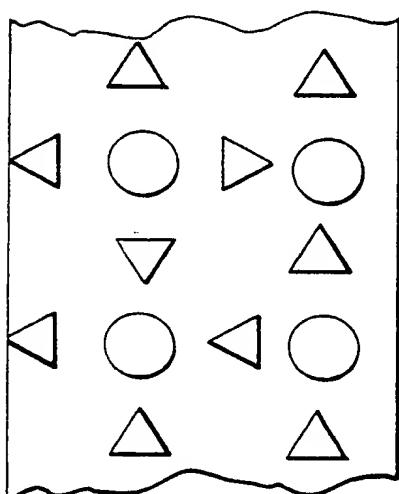
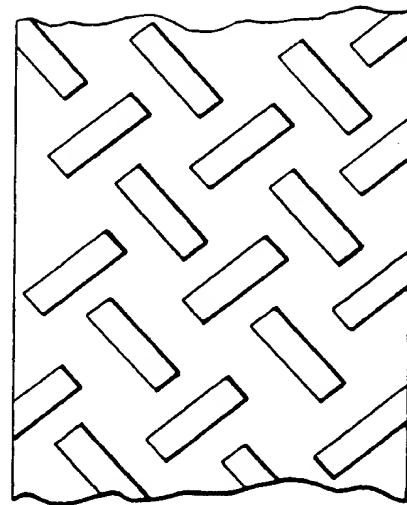


FIG 6

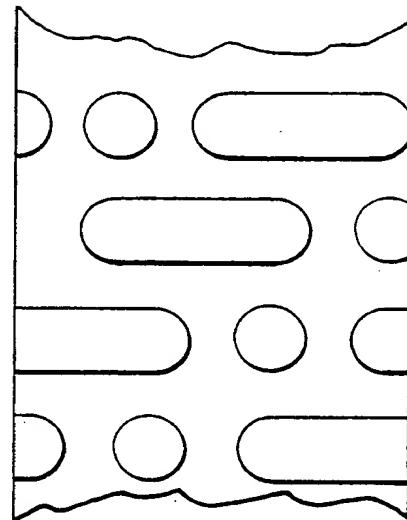


FIG 7

## PRODUCTION METHOD

This invention relates to material for insoles for footwear and methods of producing same.

A known form of insole comprises a layer of soft foamed material such as latex, which conveniently forms a coating on one side of an weave backing material. On the surface of the layer remote from the backing material there is adhered randomly or in a predetermined pattern, a plurality of nodules formed from a harder material than that forming the aforesaid layer. The insole can be used as described with the nodules providing a massaging effect and the channels defined between the nodules providing for ventilation. The nodules may be covered with a further layer of soft foamed material so that they become embedded and in this case the nodules continue to provide a massaging action when the insole is in use but the ventilating action is eliminated. Further layers such for example as a fleece may be provided for insulation purposes. Conveniently the fleece is heat sealed to the further layer. Alternatively the nodules may be covered directly by for example a fleece so that the massaging and ventilating actions are retained but with an insulating effect provided by the fleece.

A known way of providing the nodules is to use a screen printing technique which deposits the material which is to form the nodules onto a layer of partly cured foam material such for example as latex. The coated layer is then cured. This manufacturing process produces acceptable results even though the nodules are only lightly bonded to the surface of the softer layer however it involves the use of printing

technology and this has to be carefully controlled so that the nodules do not spread prior to completion of the product.

The object of the invention is to provide a method of making insole material in a simple and convenient form.

According to the invention a method of producing material for an insole for footwear comprises applying a layer of foam material to one side of a backing strip, partly curing the foam material, embossing the surface of the foam layer to form a series of depressions in the foam layer and fully curing the foam layer.

In the accompanying drawings:-

Figure 1 demonstrates the steps in one example of a method in accordance with the invention,

Figure 2 demonstrates the steps in another example of a method in accordance with the invention,

Figure 3 shows to an enlarged scale sections through the insole material of Figure 1, and

Figures 4-7 show various shapes which can be utilised in the construction method.

With reference to Figure 1 there is applied as a first step, to one side of a woven support backing strip 10, a layer 11 of soft foam latex material and prior to complete curing of the material to form in the layer as a

second step, depressions or holes 12. The depressions or holes may be formed by the use of an embossing roller having projections which displace the partly cured foam material to form the depressions or holes. It will be understood that the holes are in the foam material only and can extend down to but do not penetrate the support backing strip 10. The embossed layer is fully cured following which the depressions or holes 12 are filled with a harder foam material. This material may be wiped over the surface of the embossed layer so as to leave substantially no material on the surface other than that which fills the depressions or holes. The product is then subjected to another curing stage and the harder foam material forms the equivalent of the nodules.

The curing of the harder foam material by the application of heat can be controlled to provide a number of effects. Slow curing allows the liquid in the foam mainly water, to disperse slowly so that the harder foam merely forms a skin below or more or less flush with the surface of the layer as shown at 13A. More rapid heating will cause the harder material to swell so that the harder foam forms rounded projections 13B which may extend above the surface of the layer and even more rapid heating can result in vapour bubbles forming which remain as voids when curing has been completed as shown in the projections 13C.

The resulting product is very similar to that produced by the printing process but it is found that the nodules of the harder foam material are much more firmly adhered to the layer of soft material. Except possibly with the product obtained when fast curing is employed, the ventilation effect is absent. However, the massaging effect is obtained and the product as described can be provided with an insulating layer such as a fleece.

Figures 4-7 inclusive show various of the many forms of shapes which can be imparted by the embossing operation.

The material forming the further foam has different physical properties to that forming the layer 11 so as to form pockets of harder material to provide the massaging effect. Various ways of achieving the increased hardness may be utilized for example, the foam may have a different density, it may have different chemical fillers, the basic raw materials may be different or it may have a different foam bubble structure. In addition, the further foam may be coloured.

Another production method as shown in Figure 2, comprises coating a woven support backing strip 20 with a layer 21 of hard foam material which is then partly cured. The resulting layer is then embossed using an embossing surface such as the surface of a roller in which is formed a number of depressions or a hollow drum provided with apertures. As the roller is pressed onto the surface of the layer, partly cured foam is forced into the depressions or through the apertures and as the roller continues to rotate, these projections or nodules remain above the general surface of the layer. The material is then completely cured and the resulting products provides the massaging effect and ventilating effect in use. The resulting product is stiffer than the known product or that produced by the previously described process because the hard foam material forms a layer even though it is very thin, on top of the backing strip.

A layer of soft foamed material can be applied to completely enclose the nodules and the resulting product will provide a massaging effect but not a ventilating effect. A fleece can be added to provide further insulation.

However, if desired the fleece may be adhered to the crests of the nodules so that both the massaging and ventilating effects are obtained together with insulation.

A further production method comprises coating a woven support backing strip with a layer of hard or soft foam material which is then partly cured. An embossing roller having projections thereon is then utilised to form a series of holes or depressions in the foam material. The holes may if desired extend to the backing strip. The foam material is then fully cured and the resulting product is a layer of hard or soft foam material on a backing strip with apertures. This product which has a similar appearance to that shown in Figure 2, provides a massaging effect, a ventilating effect and also provides cushioning.

## CLAIMS

1. A method of producing material for an insole for footwear comprising applying a layer of foam material to one side of a backing strip, partly curing the foam material, embossing the surface of the foam layer to form a series of depressions in the foam layer and fully curing the foam layer.
2. A method according to Claim 1, including the further step of filling the depressions with a further foam material having a different density to that of the first mentioned foam and curing the further foam.
3. A method according to Claim 2, in which the curing of the further foam is controlled to determine the surface profile and/or density of the further foam.
4. A method according to Claim 2, in which the first mentioned foam material is a soft foam and the further foam material is a hard foam.
5. A method according to Claim 2, in which the further foam is wiped over the surface of the embossed foam layer to fill the depressions
6. A method according to Claim 1, in which the foam material is a hard foam.
7. Material for an insole for footwear when produced in accordance with the methods claimed in any one of the preceding claims.

## Relevant Technical Fields

(i) UK Cl (Ed.N) B5N, B6J (JB2, JB7)

(ii) Int Cl (Ed.6) A43B 13/38, 13/40, 17/14, B32B 3/26, 3/30, 5/24

## Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) ONLINE: WPI, CLAIMS

Search Examiner  
R J MIRAMS

Date of completion of Search  
6 JULY 1995

Documents considered relevant  
following a search in respect of  
Claims :-  
1 TO 7

## Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 1345150 A	(MONSANTO) eg page 3 lines 110 to 123	1, 7
X	US 4674205 A	(ANGER) eg column 2 line 46 to column 3 line 7	at least 1 to 4 and 7

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).